Wind Radar Interference

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Wind Radar Interference, Fact or Fiction

Overview

- Ongoing activities
- Interference
  - What Kind
  - Direct or Doppler
  - Passive or Active
  - Shadows and Ghost
  - Mission Impact
- Significance
- Mitigation

Ongoing Activities

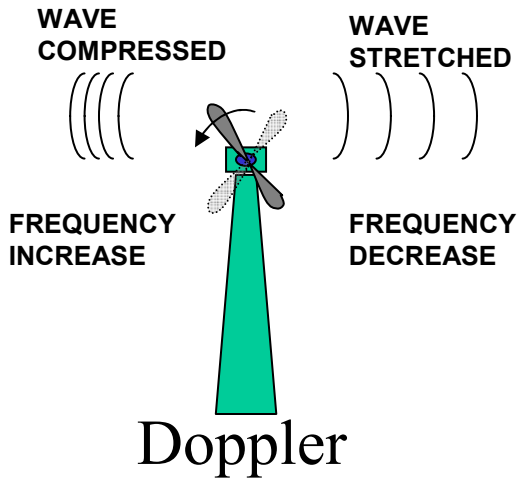
- Mission and Radar system impacts - a valid concern
- DOD conducting a Radar impact study at Senate request
  - POC - Major Susan Idziak, telephone (703) 693-8287, fax (703) 697-3501, email: Susan.Idziak@osd.mil
  - Govt Status Meetings scheduled June 14
- Multiple radar interference impacts on UK projects
- Some FAA Hazard reviews delayed
  - One Illinois and one ND site have been released
- DOE HQ & FAA Working together to help resolve issues
- DOE HQ Meeting with DOD
- Radar Manufacturers developing mitigation processes
- Not all is bad;
  - Travis AFB, Ascension AS, and FEW AFB are good examples
- No consistent permitting process in place – Yet!!!

Interference

- Is interference real, or an urban myth?
- What kind of interference?
- In all cases, there is interference
  - Remember, turbines are big reflectors
  - Interference is a relative term
- Does interference impact the mission
- Experience shows a small percentage of wind farms do impact the ability to perform the mission
- Case by case assessment often needed

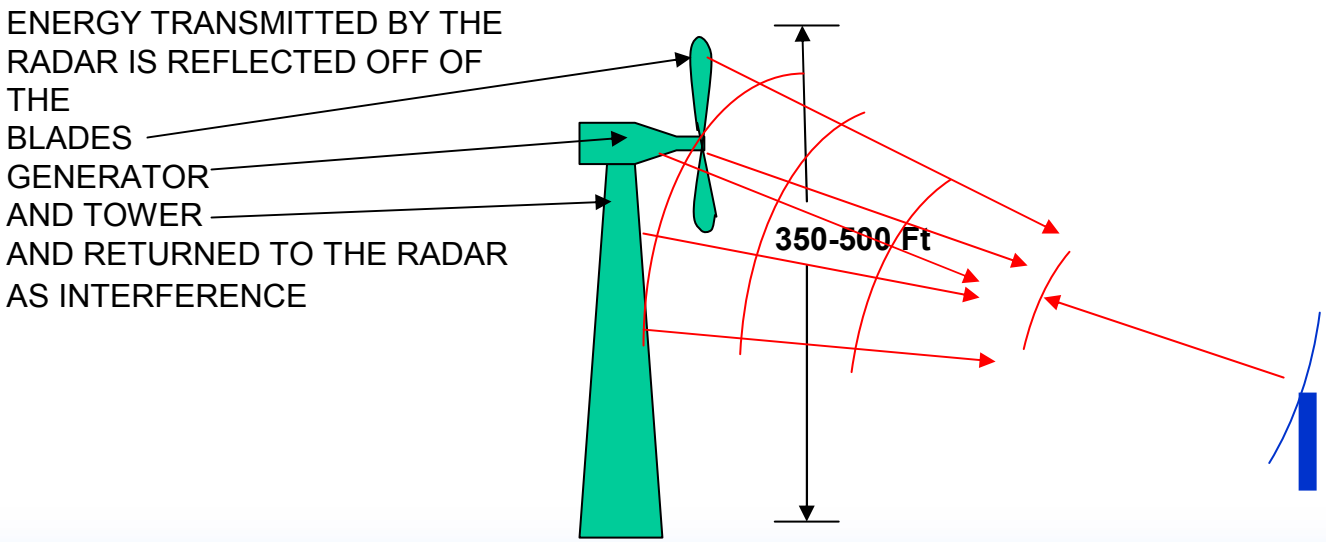
Interference

- Two main types of interference
  - Direct Interference
    - High reflectivity
    - Reducing sensitivity
    - False images
    - Shadow areas
  - Doppler Interference
    - False targets
    - False MTI/MTD's
    - Impacts both airborne and fixed radar

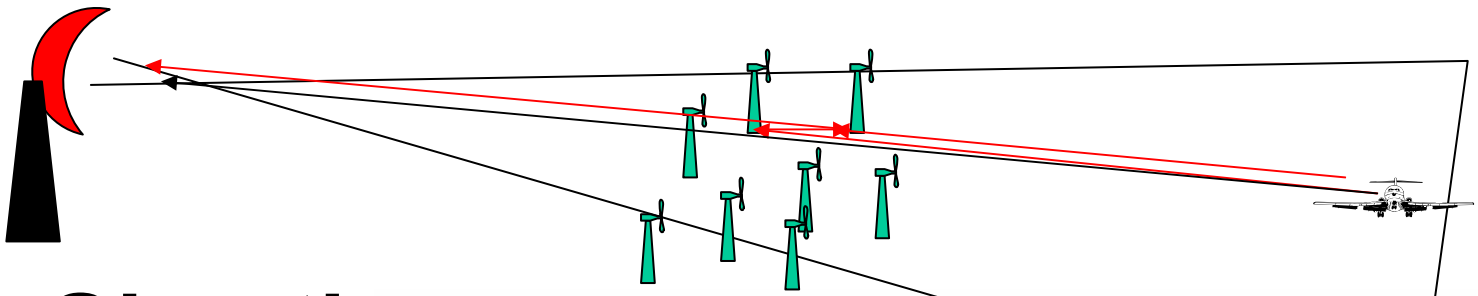


Interference

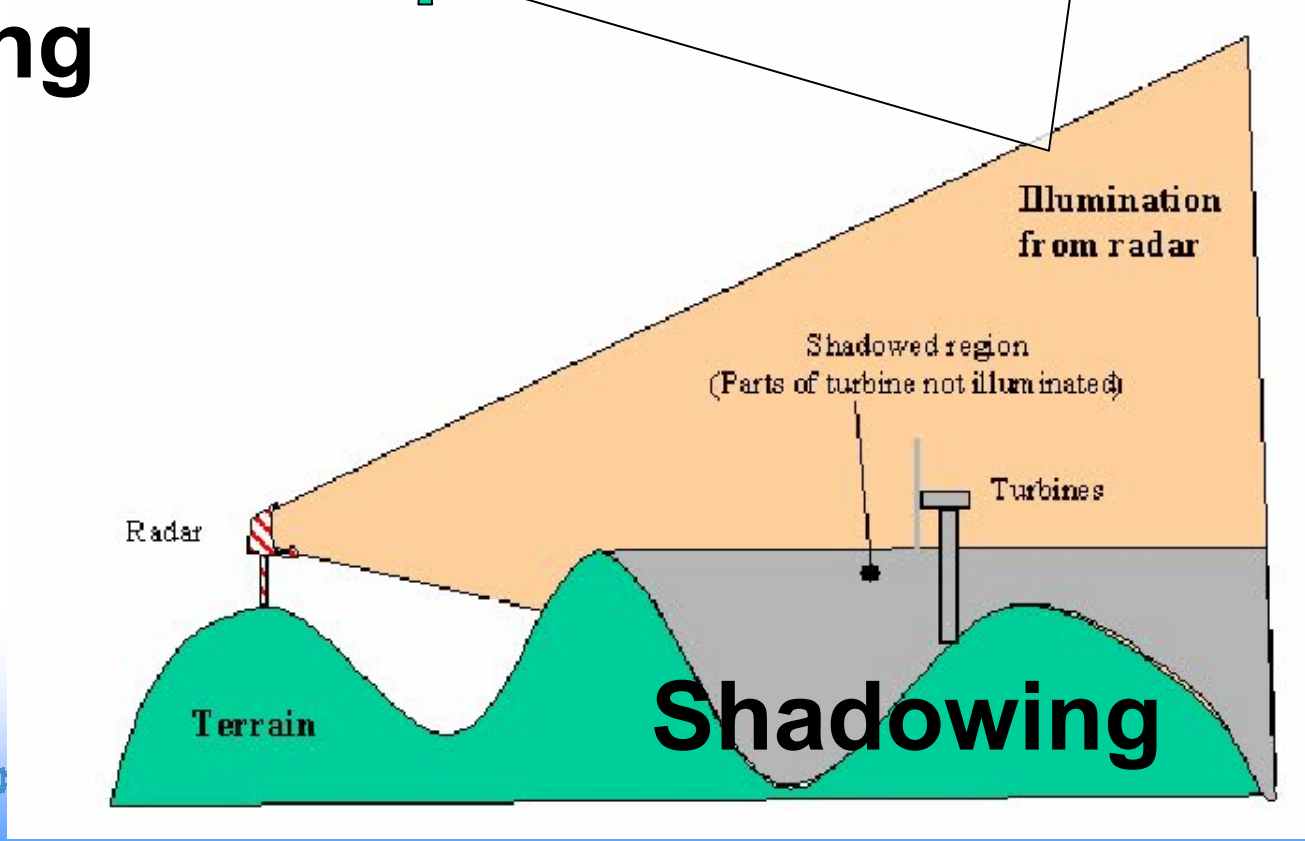
- **Wind Towers, Nacelles, and Blades all Reflect Radar Energy**
- **The Rotation of Wind Turbine Blades causes Doppler Reflections**
- **Wind Towers have a large Radar Cross Section Area (RCA), but so do buildings, hills, and high voltage towers**



Interference



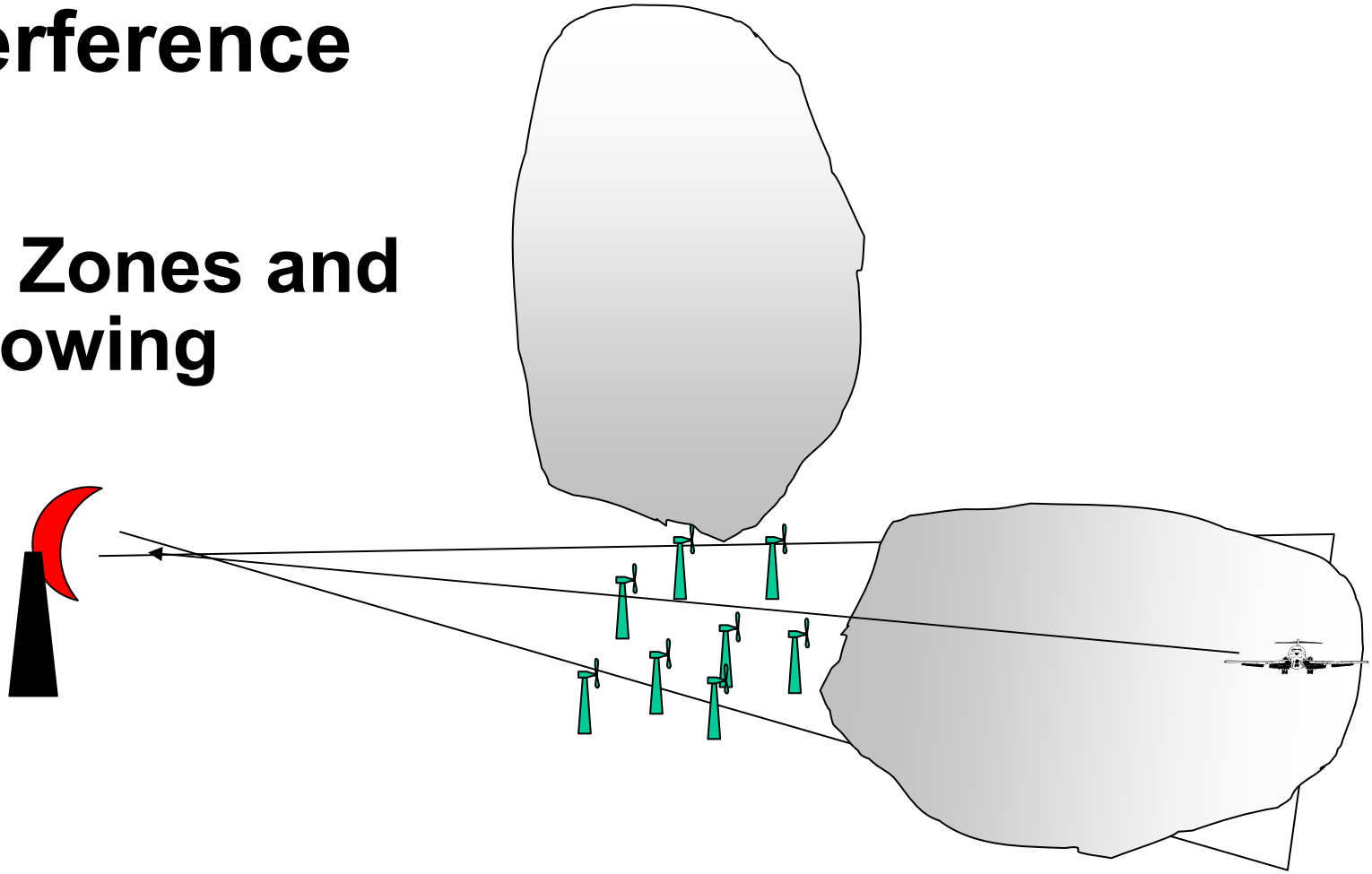
Ghosting



Shadowing

Interference

Dead Zones and Shadowing



Impacts dependent on specific radar/software attributes
- 2D, 3D, Digital, Analog, Distance, etc.

Who is Impacted?

- Myth or reality?
- Impacts primarily come from two communities
  - Military
  - Air traffic control
- Significance?
  - An individual value judgment based on
    - Individual site circumstances
    - Site, mission, and radar specifics
  - Most are OK, some are NOT!

Significance

- It matters when:
  - Wind farms add unreasonable national security risk
  - The benefits do not outweigh the impact
- However, a small percentage of proposed sites fit these categories!
  - The issue is to determine real impact, not perceived impact
  - Dialog – Key is identifying issues and resolving them case by case, early in the process
- Address mitigation

Mitigation

- FAA and/or manufacturers mitigation is often available
- Only DOD, DHS, & FAA experts can determine if mitigation is acceptable
- Examples, not inclusive
  - Impact studies and farm optimization
  - Adjust look angle
  - Reduce RCA
  - Software optimization
  - Post processors
  - Added Hardware
    - Processors and software
    - Adding transmitters and receivers

Process

- There is no single process
- Developers are reluctant to offer advanced notice
- Notice may be delayed to just before construction
- That is often too late
- FAA often acts as a focal point for US agencies
- AF has a proactive process
  - Col Crowe's Office will act as focal point for all of AF
  - They will coordinate appropriate regional and long range radar contacts
- OSD is more constrained
- Get your developers involved early

Summary

- DOE has raised awareness for action
- Industry concerned
- There is some interference from wind
- Case by Case assessment needed
- Approach all issues openly and fairly
- No and Yes are both acceptable answers
- Make decisions based on mission perceived needs
- Address mitigation
- Communicate well and often
- Strive for Win-Win Solutions

Questions?

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